Chapter 6
RECOMMENDATIONS

Seven water source options were identified and discussed in Chapter 5 that provide opportunities to address the water supply issues in the LWC Planning Area. The water source options were reviewed to assess their potential on a regional scale of meeting the water supply needs of the region (**Table 21**). The table indicates the ability of that option to meet the identified need, except for the inland environmental needs. For inland environmental needs, the response shows the ability of that option to offset demands, primarily from the Surficial Aquifer System (SAS), that could potentially cause drawdowns that are harmful to these natural systems. The relative ability of each source option in this table was based on regional volumes (supply and demand), and does not in all cases reflect the advisory committee's sense of importance of that option. For example, significant emphasis was placed on the importance of conservation and the development of a conservation ethic, although from a regional perspective, the volume of water that could be made available through conservation is low. At the local level, the potential of each option may change based on the specific needs of that local situation. Elements of conservation are incorporated with the use of each of these options.

These options can be considered a menu that local water users should consider using to meet their individual water needs. In many cases, several options will be used to meet the demands depending on the specific situation.

Chapter 5 provided recommendations for each water source option to facilitate the development of that option both at the regional level (water resource development) and the local level (water supply development). Water resource development recommendations are specific implementation strategies that support water supply development and are primarily the responsibility of the District. Water supply development recommendations are the responsibility of local governments, water suppliers, water users and utilities. Water supply development projects may be eligible for District funding assistance, if they meet appropriate criteria explained in the Funding section of this chapter. Water supply development recommendations are provided for consideration by local governments, water users and utilities. Water supply development recommendations provide guidance to local governments, water users and utilities; and will not be incorporated into the District's permitting programs and review processes.

Chapter 6 presents the implementation strategy for each of the water resource development recommendations identified in Chapter 5. Each water source option section contains: a description, the potential quantity of water that could be made available through development of that water source option, the water resource development recommendations, and the water supply development recommendations. For each water resource development recommendation, a description of the recommendation, a five-year (FY01 through FY05) implementation schedule, cost, funding source, and the implementing agency are provided. The District's fiscal year begins October 1st and ends

Table 21. Potential of Water Source Options in Meeting 2020 Lower West Coast Water Supply Needs.

	LWC Water Supply Needs				
Water Source Option	**Public Water Supply**	**Urban Irrigation Demands**	**Agricultural Irrigation Demands**	**Freshwater Needs of Estuarine Systems**	**Inland Environmental Needs**
Conservation	L	L	L	N/A	L
Ground Water					
Surficial Aquifer System	M	M	H	N/A	L
Intermediate Aquifer System	M	L	H	N/A	M
Floridan Aquifer System	H	L	L	N/A	H
Reclaimed Water	L	M	L	N/A	H
Regional Irrigation System	L	H	L	N/A	H
Seawater[a]	L	L	L	N/A	L
Storage					
Aquifer Storage and Recovery	M	M	M	H	M
Regional and Local Retention	M	M	M	H	H
Reservoirs	M	M	M[b]	H[b]	L
Surface Water	M	M	H	H	L

a. Not cost effective at this time.
b. Caloosahatchee Basin only.
L=Low; M=Medium; H=High; N/A=Not Applicable.

September 30th. For example, fiscal year 2001 (FY01) begins October 1, 2000 and ends on September 30, 2001.

Costs are presented in dollar cost and personnel time. Dollar costs include contract estimates, cost of materials, and cost-sharing with other agencies, while personnel time estimates, expressed in full-time equivalencies (FTEs), represent only District staff time.

Dollar costs in the tables are stated in 1000's and do not include the cost of FTEs. Costs include monies from the District and other agencies, unless otherwise specified. The funding approach for the LWC Water Supply Plan, as well as potential funding sources for water resource development recommendations and water supply development recommendations, are described in the Funding section of this Chapter.

The recommendations contained in this plan are subject to District Governing Board approval and budgetary appropriation for future fiscal years. As a result, the schedules identified in the plan are subject to change based on future resource and budgetary constraints. The Five Year Water Resource Development Work Program will be developed following approval of the water supply plans.

1. CONSERVATION

This option incorporates water conservation measures that address demand reduction, including practices that achieve long-term permanent reductions in water use. Whereas the other water source options in this chapter make additional water available through new sources or storage. Elements of conservation are incorporated in each of the other water source options. For example, the use of reclaimed water could be used to replace existing use of potable water or ground water for irrigation, resulting in reduced demands on these sources.

Conservation - Quantity of Water Potentially Available

Implementation of the existing mandatory water conservation elements (see Chapter 5) is estimated to result in a 10 percent reduction of the PWS and domestic self-supplied demand through 2020 or approximately 17 MGD. In 1998, the two existing mobile irrigation lab's (one agricultural, one urban) evaluations resulted in a potential water savings of 4.25 MGD (agricultural – 4.03 MGD, urban - 0.22 MGD). Similar savings could be anticipated in future years. With establishment of two additional labs (one agricultural, one urban) in the LWC Planning Area as recommended, the quantity of water savings would increase.

Retrofit measures with ultra-low volume fixtures and rainswitches in urban area could result in the following water savings if 10,000 units were installed: toilet, 0.24 MGD; showerhead, 0.50 MGD; and rainswitches, 5.73 MGD. Likewise, conversion of 10,000 acres of citrus from flood irrigation to micro irrigation could reduce pumpage by approximately 6.30 MGD **(**pumpage only, does not include return flow).

Additional water savings will be achieved through implementation of a comprehensive water conservation program that promotes cultivation of a conservation ethic. This ethic would be realized through proactive, cooperative efforts between water users, utilities, local governments, and the District. The comprehensive water conservation program efforts will incorporate many initiatives, including continued development and compliance with water conservation ordinances, development and implementation of public education programs, use of alternative water sources, and other

means. This plan will encompass all use types, as well as, indoor and outdoor uses. The plan will incorporate consideration of Xeriscape™ principles. Less water intensive landscaping will be promoted through compliance with District CUP conditions, DRI review, and compliance with local government new and existing ordinances and land use regulations. Retrofit measures will be evaluated with the other options, and implemented as deemed appropriate. The conservation program will be developed through public meetings.

Conservation Water Resource Development Recommendations

1.1 Recommendation - Water Conservation Program: The District will develop and implement a comprehensive water conservation program to cultivate a conservation ethic in cooperation with water users, utilities and local governments to promote water conservation and more efficient use of the water resources in the LWC Planning Area. The conservation program will incorporate continued development and compliance with water conservation ordinances, development and implementation of public education programs, use of alternative water sources, other conservation methods and documenting new and existing water conservation efforts. The conservation program will encompass all uses, but should provide emphasis on the outside use of water and Xeriscape™ principles. The creation of a water conservation coordinator position and provisions for fiscal incentives are envisioned as potential tools to establish the water conservation program to cultivate a conservation ethic.

Subtasks

1.1.a Redirect an existing position to a water conservation coordination position

1.1.b Develop a comprehensive conservation program in cooperation with water users, utilities and local governments, including the following:

- Identification of inefficiencies in water use
- Identification of projects and programs to improve water use efficiency through incentive and regulatory approaches
- An evaluation of the effectiveness of various options in meeting the existing and projected needs of the project area
- Identification of specific conservation measures that should be incorporated in the update to this plan
- Development and implementation of public education programs
- Assistance to local governments in development of water conservation ordinances, land use regulations and compliance programs
- Optimization of the use of the CUP Program and DRI review abilities to implement conservation

- Identification of cost sharing or incentive programs
- Development of numeric efficiency goals for each major user/ project area

Description - The District will develop and implement a comprehensive water conservation program. To implement this plan recommendation, it is envisioned that a water conservation coordination position be created from an existing position to focus on development of a comprehensive water conservation program and establishment of a strong water conservation ethic. The coordinator will also assist water users and utilities to develop their own customized water conservation program and establish numeric efficiency goals that are cost-effective and achievable, and to further public education. This program and position will be implemented Districtwide.

Total Cost: $425,000 FTEs: 1.50

Funding Source: SFWMD

Implementing Agency: SFWMD

Table 22. Summary of Estimated Schedule and Costs for Recommendation 1.1.

Water Conservation Program		Plan Implementation Costs ($1,000s and FTEs)											
		FY01		FY02		FY03		FY04		FY05		Total	
		$	FTE	$	FTE	$	FTE	$	FTE	$	FTE	$	FTE
1.1.a, b	Redirect water conservation coordinator position, and develop conservation program Est. start date: 10/00 Est. finish date: ongoing	85	0.30	85	0.30	85	0.30	85	0.30	85	0.30	425	1.50
1.1 DW	Total	85	0.30	85	0.30	85	0.30	85	0.30	85	0.30	425	1.50

DW- LWC portion of a Districtwide program.

1.2 Recommendation - Mobile Irrigation Labs: The District will support maintaining the existing mobile irrigation labs (MILs) (one agricultural, one urban) and encourage establishment of two additional MILs (one agricultural, one urban) in the LWC Planning Area through identification of dedicated non-District funding sources for existing and additional MILs.

Subtasks

1.2.a Maintain existing MILs in the LWC Planning Area.

1.2.b Identify dedicated non-District funding sources to support existing MILs, and establishment of two additional MILs.

1.2.c Establish two additional MILs (one agricultural, one urban) in the LWC Planning Area.

Description: Continue existing MIL presence in the LWC Planning Area and identify dedicated non-District funding source(s) to replace current SFWMD participation. Establish two additional MILs in the LWC Planning Area and secure dedicated non-District funding for these.

Total Cost: $0 FTEs: 0.25

Funding Source: DEP, DACS, Soil and Water Conservation Districts (SWCD), User Fees, water users and utilities (potential sources)

Implementing Agency: SFWMD, SWCD and DACS.

Table 23. Summary of Estimated Schedule and Costs for Recommendation 1.2.

Mobile Irrigation Labs		Plan Implementation Costs ($1,000s and FTEs)											
		FY01		FY02		FY03		FY04		FY05		Total	
		$	FTE	$	FTE	$	FTE	$	FTE	$	FTE	$	FTE
1.2.a,c	Maintain MILs and expand existing program		0.01		0.01		0.01		0.01		0.01		0.05
1.2.b	Identifying Funding Sources Est. start date: 10/00 Est. finish date: 9/01		0.20										0.20
1.2	Total		0.21		0.01		0.01		0.01		0.01		0.25

Conservation - Water Supply Development Recommendations

- Utilities and local governments must consider implementation and compliance with all appropriate PWS mandatory conservation elements and ordinances, where appropriate.
- Water users and utilities must consider implementation of higher efficiency irrigation systems and other conservation measures, where appropriate.
- Local governments and utilities must encourage the use of alternative water sources for nonpotable uses, versus using potable water.
- Water users, utilities, and local governments must encourage maintaining the existing MILs and establishment of two additional MILs (one agricultural, one urban) in the LWC

Planning Area. Assist in identifying dedicated non-District funding sources to support the MIL program.

- Water users and utilities must consider evaluating the need and potential of retrofit conservation measures, in addition to other source options.
- Local governments and utilities must consider developing and implementing water conservation public education programs in cooperation with the District.
- Local governments must consider developing and codifying, including a compliance program, land use regulations that require installation of and maintaining less water intensive landscaping.
- Local governments must consider developing, and codifying, including a compliance program, water conservation ordinances.

2. GROUND WATER RESOURCES

Three major aquifer systems exist within the LWC Planning Area. These aquifers are identified as the Surficial Aquifer System (SAS), the Intermediate Aquifer System (IAS), and the Floridan Aquifer System (FAS). Recommendations regarding the aquifers will be presented in the order listed above.

Determining the safe yield of an aquifer system involves careful analysis of a number of technical and environmental issues. Although, total yield of an aquifer can be determined by analysis of recharge, aquifer flow characteristics and the areal extent and vertical extent of the formation. The safe yield of the system is limited by the need to protect the existing users of the system, environmental resources, and the aquifer system itself from degradation in quality or yield from saltwater intrusion, inter-aquifer migration, other contaminants or, physical changes in the aquifer.

2.1 Surficial Aquifer System (SAS)

The Surficial Aquifer System (SAS) consists of two aquifers in the LWC Planning Area, the water table and the lower Tamiami. These aquifers are recharged from the surface and are separated by leaky confining units over the majority of the LWC Planning Area. Wellfields using these aquifers are typically limited by the rate of recharge and water movement in the aquifer, environmental impacts, proximity to contamination sources, saltwater intrusion, and other existing legal users in the area.

SAS - Quantity of Water Potentially Available

Based on the 1994 Plan analysis and information contained in Chapter 4, from a regional perspective, increases in production from the SAS along the coast beyond existing demands appears limited due to potential wetland impacts and salt water intrusion. However, it was concluded some further development of the SAS can be

accomplished in these areas at the local level through modifications to wellfield configurations and pumping regimes with respect to locations of wetlands and salt water. Increasing storage, through ASR or regional and local retention, will also allow further development of the SAS. As a result, additional withdrawals from the SAS in these coastal areas will have to be evaluated on a project-by-project basis.

It was further concluded that the SAS is sufficient to meet the existing and proposed SAS projected agricultural demands through 2020 in eastern Collier County and southwestern Hendry County. The volume of water that could be withdrawn by any specific user must be determined through the District's consumptive use permitting program.

SAS - Water Resource Development Recommendations

2.1.1 Recommendation - Surficial Aquifer Monitoring: The District should review existing water quality and water level monitoring for the SAS aquifers in the LWC Planning Area. Well locations and parameters should be compared with areas of current and projected land use development, utilization of the aquifer, areas of existing saltwater intrusion, and areas where there is a potential for saltwater intrusion. The District's monitoring program will be maintained and should be expanded where appropriate. Emphasis should be placed on monitoring and analysis of water levels and salinity levels.

Subtasks

2.1.1.a Review existing water quality and water level monitoring program and define additional data needs.

2.1.1.b Design network changes where appropriate.

2.1.1.c Establish modified water quality and water level monitoring network, including drilling additional wells and installing sampling equipment, where appropriate. This may involve increasing cooperative programs with the USGS.

2.1.1.d Collect samples and conduct lab analysis.

Description: The existing water quality and water level monitoring program in the SAS will be evaluated and expanded, where appropriate, to ensure sufficient data is being collected to study and detect changes in the aquifer. The recently implemented real-time monitor well network should be expanded, or at least maintained at current levels. It is recommended this data be used in the analysis including developing appropriate tools to develop threshold groundwater levels for future water shortage declarations to prevent significant and serious harm to the resources (see recommendation 8.1.2). Historically, the majority of the long-term and regionally extensive monitoring within the basin has been conducted through cooperative programs between the District and the USGS. These cooperative programs should be continued and augmented where necessary. These cooperative

programs have proven to be an effective way to collect data. In some cases, they are the only source of historical data that present and future conditions can be compared to. The real time network allows the District to maximize use of the resource while conducting monitoring on a real-time basis to make certain that no detrimental impacts are occurring.

Total Cost: $ 460,000 FTEs: 3.35

Funding Source: SFWMD

Implementing Agency: SFWMD

Table 24. Summary of Estimated Schedule and Costs for Recommendation 2.1.1.

Surficial Aquifer Monitoring		Plan Implementation Costs ($1,000s and FTEs)											
		FY01		FY02		FY03		FY04		FY05		Total	
		$	FTE	$	FTE	$	FTE	$	FTE	$	FTE	$	FTE
2.1.1.a & b	Define data needs Est. start date: 10/00 Est. finish date: 9/01		0.60										0.60
2.1.1.c	Establish modified network drill wells and install data loggers Est. start date: 10/01 Est. finish date: 9/01			170	0.50	70	0.50					240	1.00
2.1.1.d	Data collection and lab analysis Est. start date: 10/01 Est. finish date: 9/05			50	1.00	50	0.25	60	0.25	60	0.25	220	1.75
2.1.1	Total	0	0.60	220	1.50	120	0.75	60	0.25	60	0.25	460	3.35

2.1.2 Recommendation - Surficial Aquifer Rulemaking: To promote consistency, the SAS concepts and criteria used in this plan should be incorporated into the District's CUP Program and other components of the District's overall water supply management responsibilities through rulemaking, such as MFLs, coastal saltwater intrusion prevention, wetland protection, aquifer protection from excessive drawdowns, aquifer monitoring, and protection from contamination.

Total Cost: Costs and FTEs are incorporated into Recommendation 8.1 of Related Implementation Strategies.

Funding Source: SFWMD

Implementing Agency: SFWMD

2.1.3 Recommendation - Surficial Aquifer Modeling: As soon as feasible, but no later than the five-year update to this plan, the District shall conduct a regional

evaluation using the finer grid models currently under development for renewal of CUP's of the effects the projected demands might have on these aquifers and the associated water resources. If this regional analysis identifies potential problems, the District should revise this plan, and identify specific water resource and water supply development projects to meet the projected needs.

Total Cost: Costs and FTEs are associated with the ongoing modeling effort in support of Recommendation 8.1 in the Related Implementation Strategies section.

Funding Source: SFWMD

Implementing Agency: SFWMD

SAS - Water Supply Development Recommendations

- The potential of using the SAS for new and expanded uses should be evaluated on a project-by-project basis.
- Water users and utilities should consider development of alternative water sources that reduce reliance on the SAS.

2.2 Intermediate Aquifer System (IAS)

The Intermediate Aquifer System (IAS) consists of five zones of alternating producing and confining units, with the producing zones being the Sandstone and mid-Hawthorn aquifers.

IAS - Quantity of Water Potentially Available

Based on the 1994 Plan analysis and information contained in Chapter 4, from a regional perspective, increases in production from the IAS beyond existing demands may be limited in some areas due to potential impacts on existing legal users and the productivity of the aquifer. Overall though, it was concluded that the IAS is sufficient to meet the existing and projected urban and agricultural demands through 2020. In some areas, this may require modifications to wellfield configurations and pumping regimes with respect to locations of other existing legal users and demands. The volume of water that could be withdrawn by any specific user must be determined through the District's consumptive use permitting program.

IAS - Water Resource Development Recommendations

2.2.1 Recommendation - Intermediate Aquifer Monitoring: The District should review existing water quality and water level monitoring for the IAS aquifers in the LWC Planning Area. Well locations and parameters should be compared with areas of current and projected land use development, utilization of the aquifer, areas of existing saltwater intrusion, and areas where there is a potential for saltwater intrusion. The District's monitoring program will be maintained and should be

expanded where appropriate. Emphasis should be placed on monitoring and analysis of water levels and salinity levels.

Subtasks

2.2.1.a Review existing water quality and water level monitoring program and define additional data needs.

2.2.1.b Design network changes where appropriate.

2.2.1.c Establish modified water quality and water level monitoring network, including drilling additional wells and installing sampling equipment, where appropriate.

2.2.1.d Collect samples and conduct lab analysis.

Description: The existing water quality and water level monitoring program in the IAS will be evaluated and expanded where appropriate to ensure sufficient data is being collected to study and detect changes in the aquifer. The recently implemented real-time monitor well network should be expanded, or at least maintained at current levels. It is recommended this data be used in the analysis including developing appropriate tools to develop threshold ground water levels for future water shortage declarations to prevent significant and serious harm to the resources (see recommendation 8.1.2). Historically, the majority of the long-term and regionally extensive monitoring within the basin has been conducted through cooperative programs between the District and the USGS. The District's long-term water level and water quality monitoring cooperative programs with the USGS should be continued and augmented where necessary. These cooperative programs have proven to be an effective way to collect data. In some cases, they are the only source of historical data that present and future conditions can be compared to. The real time network allows the District to enable the maximum possible use of the resource while monitoring on a real-time basis to make certain that no detrimental impacts are occurring.

Total Cost: $ 490,000 FTEs: 1.65

Funding Source: SFWMD

Implementing Agency: SFWMD

Table 25. Summary of Estimated Schedule and Costs for Recommendation 2.2.1.

Intermediate Aquifer Monitoring		Plan Implementation Costs ($1,000s and FTEs)											
		FY01		FY02		FY03		FY04		FY05		Total	
		$	FTE	$	FTE	$	FTE	$	FTE	$	FTE	$	FTE
2.2.1.a & b	Define data needs Est. start date: 10/00 Est. finish date: 9/01		0.60										0.60
2.2.1.c	Establish network drill wells and install autosamplers Est. start date: 10/01 Est. finish date: 9/01			240	0.25							240	0.25
2.2.1.d	Data collection of monthly samples and lab analysis Est. start date: 10/01 Est. finish date: 9/05			100	0.20	50	0.20	50	0.20	50	0.20	250	0.80
2.2.1	Total		0.60	340	0.45	50	0.20	50	0.20	50	0.20	490	1.65

2.2.2 Recommendation - Intermediate Aquifer Rulemaking: To promote consistency, the IAS concepts and criteria used in this plan should be incorporated into the District's CUP Program and other components of the Districts overall water supply management responsibilities through rulemaking, such as MFLs, coastal saltwater intrusion prevention, aquifer protection from excessive drawdowns, aquifer monitoring, and protection from contamination.

Total Cost: Costs and FTEs are incorporated into Recommendation 8.1 of Related Implementation Strategies.

Funding Source: SFWMD

Implementing Agency: SFWMD

2.2.3 Recommendation - Intermediate Aquifer Modeling: As soon as feasible, but no later than the five year update to this plan, the District shall conduct a regional evaluation using the finer grid models currently under development for renewal of CUP's of the effects the projected demands might have on these aquifers and the associated water resources. If this regional analysis identifies potential problems, the District should revise this plan, and identify specific water resource and water supply development projects to meet the projected needs.

Total Cost: Costs and FTEs are associated with the ongoing modeling effort in support of Recommendation 8.1 in the Related Implementation Strategies section.

Funding Source: SFWMD

Implementing Agency: SFWMD

IAS - Water Supply Development Recommendations

- The potential of using the IAS for new and expanded uses should be evaluated on a project-by-project basis.
- Local governments should consider passage of an ordinance requiring installation of positive displacement submersible pumps and appropriately sized wells, especially in Charlotte, Collier, Glades and Lee counties and in areas where water levels are projected to fall 20 feet or greater below land surface.

2.3 Floridan Aquifer System (FAS)

The Floridan Aquifer System (FAS) underlies all of Florida and portions of southern Georgia and Alabama. It is the principal source of water in Central Florida; however, the FAS yields only nonpotable water throughout most of the LWC Planning Area. The quality of water in the FAS deteriorates southward, increasing in hardness and salinity. With depth, the salinity increases, making the deeper producing zones less suitable for the water supply development than the shallower zones near the top of the aquifer. Within the LWC Planning Area, the FAS is not influenced by variations in rainfall. Water must be treated by desalination to produce a potable product. The most productive zones in the FAS in the LWC Planning Area are the lower Hawthorn, Suwannee, and Avon Park aquifers.

The recommendations that follow are presented as distinct and separate programs but are complementary and share resources in the development of knowledge regarding the FAS. Knowledge gained is shared among the other programs.

FAS - Quantity of Water Potentially Available

The FAS has been used for many years by several of the coastal utilities in the LWC Planning Area. Several other utilities have recently initiated use of or plan to use the FAS. However, there is limited information, data, and experience on a regional scale regarding the use of the FAS in the LWC Planning Area. A single regional FAS ground water model for the Lee, Collier, and Hendry counties does not exist. Several local FAS models have been used by Cape Coral, Lee County and others. Additionally, this assessment did not incorporate a water quality component. However, based on the existing data, knowledge, and experience in the LWC Planning Area, as well as FAS experience in other areas, it was concluded that the FAS could support all of the existing and 2020 projected demands (56,615 MGY or 155 MGD) for the potable water utilities.

FAS - Water Resource Development Recommendations

2.3.1 Recommendation - Floridan Aquifer Model: The District should develop a comprehensive FAS ground water model based on all existing and future information available focusing on Lee, Collier, and possibly Hendry counties to conduct predictive analysis in the future. This model would be for use by the

District and the public to evaluate both water withdrawals and storage via ASR. The model should be developed and refined with user participation and information collected through the CUP Program, water users, utilities, and other sources with regard to water quality, water levels, and hydrologic characteristics, when appropriate. Other sources that may be utilized include existing monitoring wells or wells that may be converted to monitoring wells instead of being abandoned. Appropriate well site selection should consider model boundary conditions and not be limited to the LWC Planning Area.

Subtasks

2.3.1.a. Determine sufficiency of existing data to support model development. If existing data is not sufficient, identify additional data needs.

2.3.1.b Collect additional data as determined appropriate in 2.3.1.a.

2.3.1.c Develop FAS model for Lee, Collier and possibly Hendry counties.

2.3.1.d Refine model with data collected through sharing agreements, CUP Program and other available sources.

Description: Development of a FAS model covering Lee, Collier, and possibly Hendry counties with the abilities to evaluate FAS use, as well as storage through ASR, and changes in water quality. The FAS model will be developed according to the data anticipated to be available. ASR, identified in the CWMP for storage needs developed as part of the CERP or SWFS, will provide opportunities to develop water quality, water level and hydrologic data in the Hendry County portion of the LWC Planning Area. FTE's address development of the model.

Total Cost: $ 2,530,000 FTEs: 9.70

Funding Source: SFWMD, water users, utilities

Implementing Agency: SFWMD

Table 26. Summary of Estimated Schedule and Costs for Recommendation 2.3.1.

Floridan Aquifer Model		Plan Implementation Costs ($1,000s and FTEs)											
		FY01		FY02		FY03		FY04		FY05		Total	
		$	FTE	$	FTE	$	FTE	$	FTE	$	FTE	$	FTE
2.3.1.a	Determine data sufficiency Est. start date: 10/00 Est. finish date: 4/01		0.50										0.50
2.3.1.b	Collect additional data well drilling pump tests auto samplers Est. start date: 10/01 Est. finish date: 9/04			700	1.00	1,420	2.20	390	0.90	20	0.10	2,530	4.20
2.3.1.c	Develop FAS model Est. start date: 10/02 Est. finish date: 9/04						2.00		2.00				4.00
2.3.1.d	Refine model Est. start date: 10/02 Est. finish date: 9/09										1.00		1.00
2.3.1	Total		0.50	700	1.00	1,420	4.20	390	2.90	20	1.10	2,530	9.70

2.3.2 Recommendation - Floridan Aquifer Monitoring: The District should expand the FAS ground water monitoring network to collect the data necessary to establish the relationship between water use, water levels, and water quality in the LWC Planning Area.

Subtasks

2.3.2.a Define data needs.

2.3.2.b Design water quality monitoring network.

2.3.2.c Establish water quality monitoring network.

2.3.2.d Collect samples and conduct lab analysis.

Description: Establish a water quality monitoring network to initiate collecting data necessary to determine the relationship between water use, water levels, and water quality in the future.

Total Cost: $299,000 FTEs: 3.70

Funding Source: SFWMD

Implementing Agency: SFWMD

Table 27. Summary of Estimated Schedule and Costs for Recommendation 2.3.2.

Floridan Aquifer Monitoring		Plan Implementation Costs ($1,000s and FTEs)											
		FY01		FY02		FY03		FY04		FY05		Total	
		$	FTE	$	FTE	$	FTE	$	FTE	$	FTE	$	FTE
2.3.2.a & b	Define data needs and design network Est. start date: 10/00 Est. finish date: 9/01		[a]										
2.3.2.c	Establish network Est. start date: 10/01 Est. finish date: 9/04	80	1.10	10	0.20	10	0.20	10	0.20	10	0.20	120	1.90
2.3.2.d	Initiate sampling Est. start date: 10/01 Est. finish date: 9/05	27	0.30	31	0.30	39	0.40	41	0.40	41	0.40	179	1.80
2.3.2	Total	107	1.40	41	0.50	49	0.60	51	0.60	51	0.60	299	3.70

a. Completed in task 2.3.1 a & b.

2.3.3 Recommendation - Floridan Aquifer Data Partnerships: The District should develop and recognize partnership agreements during development of the scope of work with water users and utilities who are or planning to develop the FAS for water supply, ASR, or wastewater effluent disposal. These partnerships will collect water quality, water level, and hydrologic information related to the FAS. Information could be gained via packer tests, coring/testing of specific intervals plus geophysical logging (e.g. permeability logs) and aquifer performance testing. The District should budget for these items and cost-share for additional testing and data acquisition. The development of partnerships to share collected data will be in addition to and complementary to the data collection efforts described in tasks 2.3.1 and 2.3.2.

Subtasks

2.3.3 Utilize analysis in subtasks 2.3.1.a and 2.3.2.a to determine information needs and geographic locations desired for the expansion of FAS hydrologic and water quality data gathering. Explore data sharing with utilities and others for new and existing wells. Write sharing agreements to gather data, where possible, for existing wells and during well drilling and pump tests.

Description: Collect additional information to enhance FAS knowledge in conjunction with water users and utilities as they develop well drilling programs for the FAS as a source, ASR, and wastewater effluent disposal.

Total Cost: $500,000 FTEs: 1.40

Funding Source: SFWMD, water users and utilities

Implementing Agency: SFWMD.

Table 28. Summary of Estimated Schedule and Costs for Recommendation 2.3.3.

Floridan Aquifer Data Partnerships		Plan Implementation Costs ($1,000s and FTEs)											
		FY01		FY02		FY03		FY04		FY05		Total	
		$	FTE	$	FTE	$	FTE	$	FTE	$	FTE	$	FTE
2.3.3	Expand FAS Hydrologic and water quality data base through cooperative data sharing and collecting agreements Est. start date: 10/00 Est. finish date: 9/05	100	0.20	100	0.40	100	0.40	100	0.20	100	0.20	500	1.40
2.3.3	Total	100	0.20	100	0.40	100	0.40	100	0.20	100	0.20	500	1.40

2.3.4 Recommendation - Floridan Aquifer Government Cooperation: The District should continue to work with other government entities, including the legislature, FDEP and USEPA to explore environmentally acceptable alternative desalination concentrate disposal options.

Total Cost: Costs and FTEs are incorporated into Recommendation 8.2 of Related Implementation Strategies.

Funding Source: SFWMD

Implementing Agency: SFWMD

FAS - Water Supply Development Recommendations

- Local water users and utilities should consider using the FAS to reduce demands on freshwater sources in the LWC Planning Area. Within the LWC Planning Area, the FAS is not influenced by variations in rainfall.
- Local water users and utilities should consider involving the District in development of their FAS well drilling programs for water supply, ASR and wastewater effluent disposal to collect FAS water quality, water level, and hydrologic information that could be used in predictive analysis and development or refinement of a FAS model.

3. RECLAIMED WATER

Reclaimed water is water that has received at least secondary treatment and basic disinfection and is reused for a beneficial purpose after flowing out of a domestic wastewater treatment facility. Whereas, reuse is the deliberate application of reclaimed water, in compliance with FDEP and District rules, for a beneficial purpose. Potential uses of reclaimed water include landscape and agricultural irrigation, ground water

recharge, industrial uses and environmental enhancement. Reclaimed water has played a significant role in meeting the needs of this region and this is expected to continue.

Reclaimed Water - Quantity of Water Potentially Available

Wastewater flows to the regional wastewater facilities in the LWC Planning Area and the potential volume of reclaimed water that could be made available is projected to increase to 97 MGD through the planning horizon, an increase of 40 MGD from 1997 flows.

The potential need in the future of applying conservation concepts to reclaimed water systems was discussed. It was suggested reuse systems should be designed to apply reclaimed water sufficiently to meet the needs of the plants, not as a disposal system.

Reclaimed Water – Water Resource Development Recommendations

Refer to the Regional Irrigation System Source Option

Reclaimed Water – Water Supply Development Recommendations

- Local governments should consider adopting building codes and land development regulations requiring proposed new projects exceeding a certain acreage threshold to construct infrastructure and use water from a reclaimed water or irrigation water source.
- Utilities should incorporate water supply considerations in development of their reclaimed water programs. These should include the resource efficiency concept of utilizing reclaimed water for the recharge of wellfields to minimize impacts to the resources.
- Utilities should consider supplemental sources and interconnection with other utilities to maximize the volume of reclaimed water that is reused. Aquifer storage and recovery among other options, should be explored to extend the use of current resources in order to meet future demands, including addressing peaks in demands or in availability of resources.

4. REGIONAL IRRIGATION SYSTEM

Significant increases in urban irrigation demands are projected through 2020. This assessment concluded that in some areas, historically used ground water sources and reclaimed water might not be sufficient to support these demands. In addition, the seasonality in demands and potential supplies, is limiting the use of some sources. For example, there is 100 percent utilization of reclaimed water supplies in some portions of

the LWC Planning Area during the dry months, while there is a surplus during the wet months. It was determined that sufficient sources of water do exist within the LWC Planning Area to meet these projected irrigation demands, including ground water, reclaimed water, and surface water. The concept of construction and operation of a regional irrigation distribution system was identified to transfer water from areas of surplus to areas of deficit. The regional irrigation system is intended to provide a source of water for urban irrigation needs. This system could conserve the fresh ground water sources, while maximizing the use of reclaimed water that would have otherwise been discharged to surface water or deep well injected and lost from the inventory. Storage will be a key component to bridge the gap between the seasonality and geographic relationships of available sources and demands. Storage through ASR is envisioned as an integral part of this system for seasonal storage. This system would make irrigation water available for local supply entities/utilities to withdraw from for distribution to meet their individual needs. This system could have many different configurations, including one large regional system, several subregional systems, or on a utility-by-utility basis.

Regional Irrigation System - Quantity of Water Potentially Available

The regional irrigation system would utilize the water sources identified and quantified in this plan, including reclaimed water, ground water, and surface water. Storage, primarily through ASR, is envisioned to be a key component of the ultimate system. The regional irrigation system option and its recommendations will provide a source for irrigation needs where the surficial is least capable of doing so and is identifying the most effective way to distribute these sources to maximize their use and satisfy the demands.

Regional Irrigation System - Water Resource Development Recommendations

4.1 Recommendation - Regional Irrigation System Study: The District will evaluate, with assistance from LWC local governments, water users, and utilities, the feasibility of constructing subregional irrigation water distribution system(s) and other options to meet the growing urban irrigation demands of this area. Reclaimed water should be used, and where availabl, should be incorporated into the evaluation. The results of this study should be incorporated in the update of this plan.

Subtasks

4.1.a Develop Statement of Work (SOW) to conduct feasibility analysis with input from representatives of local utilities and users.

4.1.b Contract and conduct feasibility analysis with consultant.

4.1.c Review results of feasibility analysis and identify preferred alternative with input from representatives of local utilities and users.

4.1.d Develop implementation strategy for preferred alternative with input from representatives of local utilities and users.

Description: The purpose of this recommendation is to conduct a refined analysis of projected urban irrigation water demands, potential water sources, and methods to distribute these sources, including storage, to meet these demands. The District will contract out this analysis. This work will involve participation from representatives of local governments, water users, and utilities. It is envisioned that partnerships will have to be developed between local governments, utilities, and the District for this system to be realized. Under one scenario, a regional irrigation system will make irrigation water available that local distribution entities, such as utilities, could utilize as a source to distribute to individual users. Local governments should consider requiring the use of this system as part of the development approval process.

Total Cost: $200,000 FTEs: 4.50

Funding Source: SFWMD, water users, and utilities. The determination of funding sources and needs for capital expenditures to develop a regional irrigation system will be determined within the feasibility analysis.

Implementing Agency: SFWMD

Table 29. Summary of Estimated Schedule and Costs for Recommendation 4.1.

Regional Irrigation System Study		Plan Implementation Costs ($1,000s and FTEs)											
		FY01		FY02		FY03		FY04		FY05		Total	
		$	FTE	$	FTE	$	FTE	$	FTE	$	FTE	$	FTE
4.1.a	Develop SOW Est. start date: 7/00 Est. finish date: 11/00		2.00[a]										2.00
4.1.b	Conduct feasibility analysis Est. start date: 2/01 Est. finish date: 4/02	200	1.50		0.50							200	2.00
4.1.c	Review results of feasibility analysis Est. start date: 5/02 Est. finish date: 9/02				0.20								0.20
4.1.d	Develop implementation strategy Est. start date: 11/02 Est. finish date: 1/03						0.30						0.30
4.1	Total	200	3.50		0.70		0.30					200	4.50

a. Includes work conducted in FY00.

Regional Irrigation System - Water Supply Development Recommendations

- Local governments should consider adopting building codes and land development regulations requiring new projects, exceeding a certain acreage threshold, to construct infrastructure and use water from a reclaimed or irrigation water source.
- Utilities should consider supplemental sources and interconnection with other utilities to maximize the volume of reclaimed water that is reused.

5. SEAWATER

This option involves using seawater from the Gulf of Mexico as a raw water source. The Gulf of Mexico appears to be an unlimited source of water from a quantity perspective; however, removal of the salts is required before use for potable or irrigation uses. A desalination treatment technology would have to be used, such as distillation, reverse osmosis, or electrodialysis reversal (EDR).

Seawater – Quantity of Water Potentially Available

The volume of water available from the Gulf of Mexico appears to be unlimited and could meet the needs of this region through 2020.

Seawater - Recommendations

It was concluded that seawater is a potential source of water, but at this time, it is not cost-effective.

6. STORAGE

Three types of potential storage options were identified: aquifer storage and recovery, regional and local retention, and reservoirs.

Storage - Quantity of Water Potentially Available

This is discussed under each of the following three headings.

6.1 Aquifer Storage and Recovery (ASR)

Aquifer storage and recovery (ASR) is the underground storage of injected water into an acceptable aquifer (typically the FAS in Southwest Florida) during times when water is available, and the subsequent recovery of this water during high demand periods. In other words, the aquifer acts as an underground reservoir for the injected water,

reducing water loss to evaporation. Current regulations require injected water to meet drinking water standards when the receiving aquifer is classified as an underground source of drinking water (USDW) aquifer, unless an aquifer exemption is obtained from the U.S. Environmental Protection Agency (USEPA). Obtaining an aquifer exemption is a rigorous process and few have been approved. However, the USEPA has indicated that a flexible assessment approach will be applied for systems that meet all drinking water standards except total coliform.

There are many local and regional ASR initiatives underway in the LWC Planning Area, as well as the District. These projects involve the use of potable water, reclaimed water, and partially treated ground water and surface water. The District, in cooperation with the USACE, is currently developing a pilot ASR program to determine the feasibility of using ASR for large scale storage of surface water in the Caloosahatchee River Basin. In addition, there are numerous local initiatives, some constructed and operational, involving injection of potable water and the potential use of reclaimed water. Depending on the results of these regional and local efforts, additional ASR locations and testing should be considered in the LWC Planning Area in the future.

ASR Quantity of Water Potentially Available

The volume of water that could be made available through ASR wells depends upon several local factors, such as well yield, water availability, variability in water supply, and variability in demand. Without additional information, it is not possible to accurately estimate the water that could be available through ASR in the LWC Planning Area. Typical storage volumes for individual wells range from 10 to 500 million gallons or 31 to 1,535 acre-feet (Pyne, 1995).

Aquifer storage and recovery would utilize the water sources identified and quantified in this plan. The availability of these sources varies, primarily by wet and dry season. For example, surface water availability is at its greatest during the wet season. Excess surface water is currently being discharged to tide. Aquifer storage and recovery provides a great opportunity to capture this excess water when it is available for use during drier times, maximizing the use these sources while conserving others. This would be the same for other sources, including ground water and reclaimed water. Aquifer storage and recovery wells would be typically colocated with reservoirs. The reservoirs would serve as a holding area for injection, as well as provide some treatment of the water prior to injection.

ASR Water Resource Development Recommendations

6.1.1 Recommendation - ASR Water Quality: The District should continue working with other government entities, including the legislature, Congress, USEPA, and FDEP, to explore rule changes to the federal and state Underground Injection Control (UIC) program to allow for (and encourage) injection of untreated or partially treated ground water or surface water with ASR. The level of treatment should be compatible with the water quality in the proposed storage zone.

Total Cost: Costs and FTEs are incorporated into Recommendation 8.2 of Related Implementation Strategies.

Funding Source: SFWMD

Implementing Agency: SFWMD

6.1.2 Recommendation - ASR Rulemaking: The District should develop CUP rules to address the use of the Floridan aquifer for ASR, as well as water use, to assure compatibility between use concepts.

Total Cost: Costs and FTEs are incorporated into Recommendation 8.1 of Related Implementation Strategies.

Funding Source: SFWMD

Implementing Agency: SFWMD

ASR - Water Supply Development Recommendations

- Utilities should explore ASR, among other options, to extend the use of current resources in order to meet future demands, including addressing peaks in demands or in availability of resources.

6.2 Regional and Local Retention

Regional and local retention looks at opportunities to increase water storage in watersheds through manipulation and modification of the drainage system that serves that area, while still maintaining an appropriate level of flood protection. Much of the LWC Planning Area was drained to support agricultural and urban development. This has resulted in lowered ground water tables that may impact natural systems as well as water availability in these areas. The analysis in the 1994 LWC Water Supply Plan concluded that modifying water levels in existing drainage canals and eliminating unnecessary canals can significantly elevate ground water levels in the Big Cypress Basin. Committee members stated that the work completed by the Big Cypress Basin has increased water retention in their canal systems and that has resulted in increased ground water levels. This has resulted in reducing the frequency of irrigation.

Regional and Local Retention – Quantity of Water Potentially Available

The quantity of water that could be made available from regional and local retention is site-specific, and will vary depending on the extent and topography of the watershed being modified, the considerations used in the initial system design and construction, the condition of existing facilities, and the current operational protocols.

The Cape Coral Gator Slough/Reuse System Enhancement Project has the potential to increase water availability by 19 MGD, while the East County Aquifer Recharge Project Phase II-1 will raise water levels in a 9,084 acre watershed and provide 220 acre-feet of additional storage in their canal system.

The Big Cypress Basin estimates that implementation of the Big Cypress Basin Water Management Plan will increase water storage in their system by at least 60,000 acre-feet or 19,600 MG. This was based on the additional volume of water that will be stored in the canals resulting from increased water levels. Only in southern Golden Gate Estates was the increase in the water table (water stored in the aquifer) accounted for. Additional aquifer storage will also be created with the other projects. These projects will conserve freshwater through retention of additional freshwater in the watershed and decreasing the volume of "excess" water discharged to estuarine systems, increase water availability through ground water recharge, and potentially reduce the frequency of irrigation (and demands) by increasing soil moisture through increased ground water levels.

It is anticipated several other regional and local retention projects could occur over the next five years. The projects might include additional work in the Gator Slough and the Fred C. Babcock/Cecile M. Webb Wildlife Management Area, the southern CREW land, and projects related to implementation of the South Lee County Watershed Plan.

Regional and Local Retention - Water Resource Development Recommendations

6.2.1 Recommendation - Regional and Local Retention: Regional retention projects that raise water levels through either system modifications or operation changes and benefit water supply without causing environmental harm should be considered for cost-sharing from the District's Water Resource Development funds. Potential retention projects as described above include Big Cypress Basin projects and possibly additional work in the Gator Slough and the Fred C. Babcock/Cecile M. Webb Wildlife Management Area, the southern CREW land, and projects related to implementation of the South Lee County Watershed Plan.

Description: Regional and local retention projects that can benefit water supply without causing environmental harm should receive consideration for cost-share through the District's Water Resource Development funds.

Total Cost: $ 1,500,000 FTEs: 0.50

Funding Source: SFWMD

Implementing Agency: SFWMD

Table 30. Summary of Estimated Schedule and Costs for Recommendation 6.2.1.

Regional and Local Retention		Plan Implementation Costs ($1,000s and FTEs)											
		FY01		FY02		FY03		FY04		FY05		Total	
		$	FTE	$	FTE	$	FTE	$	FTE	$	FTE	$	FTE
6.2.1	Regional and local retention cost share Est. start date: 10/00 Est. finish date: 9/04	300	0.10	300	0.10	300	0.10	300	0.10	300	0.10	1,500	0.50
6.2.1	Total	300	0.10	300	0.10	300	0.10	300	0.10	300	0.10	1,500	0.50

Regional and Local Retention - Water Supply Development Recommendations

- Local and subregional entities that have responsibility for surface water management, such as 298 Drainage Districts, should evaluate their systems for the potential of increasing storage and raising ground water levels through changes in their operations and/or modifying control levels.

6.3 Reservoirs

This option involves the capture and storage of excess surface water during rainy periods and subsequent release during drier periods for environmental and human uses. Regionally, surface water storage could be used to attenuate freshwater flows to the Caloosahatchee Estuary and other estuarine water bodies during rainy periods and meet minimum flows during drier periods. In addition, these facilities could increase surface water availability for current and projected uses, and decrease the demand on aquifer systems. However, evaporative and seepage losses could significantly effect water availability and need to be considered.

Reservoirs - Quantity of Water Potentially Available

Reservoirs are considered more of a management option in that these systems allow more efficient use of other sources, such as surface water. Reservoirs typically capture excessive surface water during rainy periods for future use. Please refer to other source option descriptions for an estimate regarding the quantity of water that potentially could be made available.

Reservoirs - Water Resource Development Recommendations

At this time, regional and distributed small scale reservoirs are only being recommended in the Caloosahatchee Basin. Refer to Surface Water section regarding this recommendation and others from the CWMP.

Reservoirs - Water Supply Development Recommendations

- Agricultural operations should incorporate water conservation and water supply considerations in design of new or retrofitted surface water management systems.

7. SURFACE WATER

This option involves the use of surface water as a supply source. Surface water bodies in the LWC Planning Area include lakes, canals, and rivers. Lake Trafford and Lake Hicpochee are the two largest lakes within the LWC Planning Area, but neither is considered a reliable source of water supply. The Caloosahatchee River Basin and the associated flows from Lake Okeechobee form the largest source of surface water in the LWC Planning Area. The Caloosahatchee Water Management Plan (CWMP) addressed surface water availability from the C-43. The recommendations in the CWMP were developed through a public participation process, and incorporated extensive modeling and coordination with the both the LEC and LWC water supply planning processes. This section provides surface water recommendations developed in the LWC Water Supply Plan and incorporates the surface water recommendations in the CWMP. The CWMP recommendations became recommendations of the LWC Water Supply Plan.

Surface Water - Quantity of Water Potentially Available

Caloosahatchee River

Inflows to the Caloosahatchee Basin come from three major sources: precipitation, releases from Lake Okeechobee, and ground water seepage. The principle water use/loss mechanisms are evaporation, evapotranspiration (including irrigation), discharge to the estuary for environmental needs, and PWS.

Based on the recommended developments of water management and storage infrastructure to effectively capture and store the surface water flows in the Caloosahatchee Basin, the projected surface water needs of the basin and the estuary can be met. Agricultural demands from surface water sources within the basin are projected to increase from 230,000 acre-feet per year (200 MGD) based on 1995 land use to approximately 320,000 acre-feet per year (285 MGD) on average based on projected 2020 land use. PWS needs from the Caloosahatchee River are projected to increase from 13,000 (12 MGD) in 1995 to 18,000 acre-feet per year (16 MGD) on average by 2020. The environmental needs of the Caloosahatchee Estuary have been estimated at 450,000 acre-feet (400 MGD) while average flows to the estuary are estimated to be approximately 650,000 acre-feet per year (580 MGD) on average. Flow to the estuary in excess of the needs can, therefore, be as high as 200,000 acre-feet per year (180 MGD) on average. It was concluded that the evaluated components, once constructed, will be adequate to meet the demands during a 1-in-10 year drought condition.

Golden Gate and Faka Union Canal System

The Golden Gate Canal and the Faka Union Canal System in the Big Cypress Basin have combined average daily outflows of 560 cfs (362 MGD) and an average wet season flow of 1,020 cfs (660 MGD). This has resulted in undesirable salinity fluctuations in Naples Bay and Faka Union Bay estuaries. Big Cypress Basin presently operates three backpumping facilities to capture some of the freshwater outflows during the dry season to stimulate regional ground water recharge. There is significant potential for utilizing the wet season flows of these canals for water supply needs if storage is provided, such as ASR. The environmental needs of the estuarine systems and the Southern Golden Gate Estates Restoration Project will need to be identified to determine the specific volume of water available.

Other Potential Sources

Several other potential surface water bodies were identified that should be evaluated for water availability, including the Kehl Canal, Imperial River, Ten Mile Canal, Orange River, and Six Mile Cypress Slough. An analysis of estuarine and other environmental needs similar to the analysis conducted on the Caloosahatchee River is necessary and recommended in this plan prior to using these sources for human needs. These systems need to be analyzed for availability of water and in doing so, the rate and no harm type contribution. Establishment of MFLs should be considered where appropriate. No recommendation is made at this time regarding the specific water availability from these systems.

Surface Water – Water Resource Development Recommendations

The Surface Water - Water Resource Development Recommendations include the recommendations from the CWMP as well as those identified during the LWC Water Supply Plan process. Recommendations 7.1, 7.2, and 7.3 are from the CWMP and are identified in the Comprehensive Everglades Restoration Plan.

7.1 Recommendation from CWMP - Caloosahatchee River ASR Pilot Project: The District should work cooperatively with the USACE to site, design, construct, and operate a pilot regional ASR project. Recovery performance and additional information obtained from the construction of and cycle testing at this facility will guide the design of the regional ASR wellfield.

Description: Construct a pilot ASR project in the Caloosahatchee Basin.

Total Cost: $2,998,000 (SFWMD portion only) FTEs included in dollar costs

Funding Source: SFWMD and USACE

Implementing Agency: SFWMD and USACE

Table 31. Summary of Estimated Schedule and Costs for Recommendation 7.1.

Caloosahatchee River ASR Pilot Project		Plan Implementation Costs ($1,000s and FTEs)											
		FY01		FY02		FY03		FY04		FY05		Total	
		$	FTE	$	FTE	$	FTE	$	FTE	$	FTE	$	FTE
7.1	Pilot ASR Project Est. start date: 10/00 Est. finish date: 9/05	250		2,300		280		84		84		2,998	
7.1 CWMP	Total[a]	250		2,300		280		84		84		2,998	

a. In-kind service includes FTEs for design and implementation of the ASR Pilot Project and will be applied against the SFWMD's portion of the 50/50 cost-share requirement.

7.2 Recommendation from CWMP - C-43 Storage Project: The SFWMD should cooperate with the USACE in development of the Project Implementation Report (PIR), design, construction, and operation of a regional reservoir and ASR project within the Caloosahatchee Basin. A comprehensive geologic and geotechnical investigation should be completed, as a part of the PIR to provide the information needed to size and design the reservoir. Development of the PIR, land acquisition, design, and plans and specifications should be completed by 2005. Construction should be initiated in 2005.

Description: C-43 Regional Reservoir Project

Total Cost: $138,094,000 (SFWMD portion only) FTE's included in dollar costs

Funding Source: SFWMD and USACE (50/50 cost share)

Implementing Agency: SFWMD and USACE.

Table 32. Summary of Estimated Schedule and Costs for Recommendation 7.2.

C-43 Storage Project		Plan Implementation Costs ($1,000s and FTEs)											
		FY01		FY02		FY03		FY04		FY05		Total	
		$	FTE	$	FTE	$	FTE	$	FTE	$	FTE	$	FTE
7.2	C-43 Regional Reservior Project Est. start date: 10/00 Est. finish date: 9/05	2,154		2,163		23,925		66,386		43,466		138,094	
7.2 CWMP	Total[a]	2,154		2,163		23,925		66,386		43,466		138,094	

a. In-kind service includes FTEs for design and implementation of the Project Implementation Report and will be applied against the SFWMD's portion of the 50/50 cost share requirement.

7.3 Recommendation from CWMP - Southwest Florida Study: The SFWMD should work in cooperation with the USACE to initiate and complete the Southwest Florida Study (SWFS) by the year 2005 as recommended in the CERP. The modeling work that has been completed as a part of the CWMP should be used as the basis for development of a preferred alternative to meet the demands within the Caloosahatchee Basin in 2020. The primary purpose of the SWFS should be to provide a framework in which to address the health of aquatic ecosystems; water flows; water quality (including appropriate pollution reduction targets); water supply; flood protection; wildlife and biological diversity; and natural habitat. Evaluations involving surface water availability for water supply purposes should be based on providing a 1-in-10 level of certainty from surface water as an optimal goal.

Subtasks

7.3.1 Complete problem identification/Project Study Plan (PSP) phase by October 2000.

7.3.2 Complete development of a preferred alternative for the Caloosahatchee Basin by 2003.

7.3.2.a It is recommended that the demand projections that were developed for the CWMP form the basis for evaluation of demands in the Caloosahatchee Basin in the SWFS.

7.3.2.b The ISGM and other models that were developed to model the Caloosahatchee Basin should be incorporated into the SWFS and be utilized to evaluate the performance of water supply storage options, such as a distributed reservoir system. During the SWFS analysis, the CWMP demands and ISGM should be refined and updated as needed for evaluation of alternatives for meeting demands in the Caloosahatchee Basin in 2020.

7.3.2.c Continue development of the modeling tools that were developed for the CWMP. These tools include the ISGM (MIKE SHE), AFSIRS/WATBAL, and optimization models that were developed for the Caloosahatchee Basin.

7.3.2.d Continue the seepage study that was initiated during development of the CWMP.

7.3.2.e The Plan of Study for the SWFS should include an evaluation of the feasibility of constructing a distributed reservoir system. In addition, the SFWMD should investigate the feasibility of public/private partnerships for funding and implementing a distributed reservoir system.

7.3.2.f There are areas immediately adjacent to the CWMP Planning Area where distributed, small-scale reservoirs could be developed that can offer improved water resource management through increased environmental and flood protection,

and increased surface water resource availability that should be investigated in the SWFS.

Description: Complete the Southwest Florida Study

Total Cost: $6,100,000 (cost estimated, SFWMD portion only) FTEs included in dollar costs

Funding Source: SFWMD and USACE (50/50 Cost Share)

Implementing Agency: SFWMD and USACE.

Table 33. Summary of Estimated Schedule and Costs for Recommendation 7.3.

Southwest Florida Study		Plan Implementation Costs ($1,000s and FTEs)											
		FY01		FY02		FY03		FY04		FY05		Total	
		$	FTE	$	FTE	$	FTE	$	FTE	$	FTE	$	FTE
7.3	Complete the Southwest Florida Study Est. start date: 10/00 Est. finish date: 09/01	1,000		1,800		1,800		1,000		500		6,100	
7.3 CWMP	Total	1,000		1,800		1,800		1,000		500		6,100	

7.4 Recommendation from CWMP - Minimum Flows and Levels: Establish MFLs for the Caloosahatchee River and Estuary by December, 2000 in accordance with Section 373.042 F.S. The MFLs will be incorporated into rulemaking described in Recommendation 8.1.1 and 8.1.2.

Surface Water Related Strategies

7.5 Recommendation from CWMP - Well Abandonment Program: The Well Abandonment Program that was administered by the SFWMD (ended in 1991) was a voluntary program that identified abandoned artesian wells, geophysically logged them, and plugged or rehabilitated the wells, as necessary, to prevent deterioration of the SAS through upland leakage or discharge to the land surface. The program documentation indicates that there are unplugged wells remaining within the CWMP Planning Area that if plugged could contribute an estimated net flow of 50,000-acre feet per year to the water budget of the Caloosahatchee Basin. In addition, the Florida Geological Survey, Bureau of Oil and Gas have identified oil test wells within the planning area that have not been adequately plugged. Additional effort should be made to locate and properly abandon the free flowing wells in the Caloosahatchee Basin. The SFWMD should work with local and state officials to locate uncontrolled abandoned wells and identify plugging strategies and applicable funding sources for proper plugging of the wells.

Description: Coordinate with local and state agencies to identify abandoned, unplugged wells and to identify potential funding sources. This involves staff support and coordination only.

Total Cost: No direct cost associated with this recommendation. FTEs: 0.60

Funding Source: Landowners, local government, Water Resource Development Funds (potential sources).

Implementing Agency: SFWMD

Table 34. Summary of Estimated Schedule and Costs for Recommendation 7.5.

Well Abandonment Program		Plan Implementation Costs ($1,000s and FTEs)											
		FY01		FY02		FY03		FY04		FY05		Total	
		$	FTE	$	FTE	$	FTE	$	FTE	$	FTE	$	FTE
7.5	Coordinate identification of unplugged wells. Est. start date: 10/00 Est. finish date: 09/01		0.30		0.30								0.60
7.5 CWMP	Total		0.30		0.30								0.60

7.6 Recommendation from CWMP - Salt Water Influence: Saline water (in excess of 250 milligrams per liter [mg/L]) has been a recurring problem for the potable water intakes in the Caloosahatchee River (approximately one-mile upstream of S-79). During extended periods of low-flow, the chloride content of the surface water increases well beyond the recommended limit of 250 mg/L for drinking water. The actual number of times that releases have been made from Lake Okeechobee in response to salt water in excess of 250 mg/L is relatively few. A number of alternatives to these releases warrant further investigation and include moving the intake farther upstream, modifications to the structure, and improved maintenance and operation of the bubble curtain. Future freshwater releases for environmental purposes may also minimize salt water influence. Additional analysis of the saline front migration should be initiated.

Description: Coordinate additional analysis of the salt water influence problem at S-79. This involves staff support and coordination only.

Total Cost: No direct cost associated with this recommendation. FTEs: 0.30

Funding Source: USACE, local government.

Implementing Agency: SFWMD

Table 35. Summary of Estimated Schedule and Costs for Recommendation 7.6.

Salt Water Influence		Plan Implementation Costs ($1,000s and FTEs)											
		FY01		FY02		FY03		FY04		FY05		Total	
		$	FTE	$	FTE	$	FTE	$	FTE	$	FTE	$	FTE
7.6	Coordinate identification of needed additional anaysis Est. start date: 10/00 Est. finish date: 09/01		0.30										0.30
7.6 CWMP	Total		0.30										0.30

7.7 Recommendation from CWMP - Permitting Issues Associated with ASRs: The SFWMD should continue working with the legislature, USEPA, and FDEP to explore rule changes to the federal and state Underground Injection Control program to allow for (and encourage) injection of untreated or partially treated ground water or surface water with ASR. The level of treatment should be compatible with the water quality in the proposed storage zone. This recommendation is included in Recommendation 8.2.

Description: Continue working with other government entities to identify and modify existing rule criteria to facilitate changes in ASR regulations that will facilitate development of source options.

Total Cost: Costs and FTEs are in recommendation 8.2 FTEs: 0

Funding Source: SFWMD

Implementing Agency: SFWMD

7.8 Recommendation - Southwest Florida Study: The Southwest Florida Study should evaluate estuary and other environmental needs for the flows from surface water bodies including: Orange River/Harn's Marsh/East County Water Control District (Lehigh Canals), Imperial River/Kehl Canal, Ten Mile Canal/Mullock Creek, Golden Gate Canal/Gordon River, and the Faka Union Canal. The results of this evaluation should be incorporated into future LWC Water Supply Plan updates.

Description: These evaluations completed as part of the Southwest Florida Study will determine the needs of the environment and the remaining water available for water supply.

Total Cost: Costs and FTEs are in recommendation 7.3 FTEs: 0

Funding Source: SFWMD (SFWMD portion only)

Implementing Agency: SFWMD and USACE

Surface Water – Water Supply Development Recommendations

- Identify potential sources and amounts of surface water available that could be to used to meet projected demands.

8. RELATED IMPLEMENTATION STRATEGIES

This section includes those recommended efforts that apply to several of the options or could not be associated with a specific source option.

Related Implementation Strategies - Water Resource Development Recommendations

8.1 Rulemaking

To promote consistency, the concepts and guidelines used in this plan should be incorporated as criteria into the District's water management programs through rulemaking or other implementation processes.

8.1.1 Recommendation - Rulemaking: The District will conduct a public rulemaking process in accordance with Chapter 120, F.S. for the purpose of incorporating salient portions of this plan in the CUP Program and other components of District's overall water supply management responsibilities. Matters that are recommended for rulemaking consideration include: (1) Level of Certainty; (2) Resource Protection Criteria; (3) Water Shortage Triggers; (4) MFLs for the Caloosahatchee River and Estuary, and the LWC aquifer system; and (5) Special Designation Area amendments, including Reduced Threshold Areas and Water Resource Caution Areas.

Subtasks

8.1.1.a Continue ongoing rule development and rulemaking.

8.1.1.b Present draft rules to Governing Board to initiate rulemaking.

8.1.1.c Present final rules to Governing Board for adoption.

Description: Rulemaking is an existing District effort.

Total Cost: No direct cost associated with this recommendation FTEs: 2.00

Funding Source: SFWMD

Implementing Agency: SFWMD

8.1.2 Recommendation - Minimum Flows and Levels: Establish MFLs for the Caloosahatchee River and Estuary and LWC aquifer system by December, 2000 in

Table 36. Summary of Estimated Schedule and Costs for Recommendation 8.1.1.

Rulemaking		Plan Implementation Costs ($1,000s and FTEs)											
		FY01		FY02		FY03		FY04		FY05		Total	
		$	FTE	$	FTE	$	FTE	$	FTE	$	FTE	$	FTE
8.1.1 a, b, c	Incorporation into the District's CUP Program through rulemaking Est. start date: ongoing Est. finish date: 06/01		2.00										2.00
8.1.1 DW[a]	Total		2.00										2.00

a. DW- LWC portion of Districtwide Program.

accordance with Section 373.042, F.S. The MFL will be incorporated into rulemaking, described in recommendation 8.1.1.

Subtasks

8.1.2.a Continue with establishment process for the subject MFLs.

8.1.2.b Incorporate proposed MFLs, and recovery and/or prevention strategy into the rulemaking process (recommendation 8.1.1) or other implementation process.

8.1.2.c Define threshold levels for water shortage declarations for the SAS and the IAS, including development of appropriate analytical tools, and collection of additional water quality and water level data, when necessary.

Description: Establish MFLs for the Caloosahatchee River and Estuary and the LWC aquifer system (water table, lower Tamiami, Sandstone, mid-Hawthorn, and Floridan aquifers) in accordance with the District's MFL priority list that was developed pursuant to Section 373.042, F.S. The District has committed to establishing a MFL for these water resources by the end of 2000. To complement the establishment of the MFLs, water shortage triggers or thresholds for water shortage declarations need to be defined for the aquifer systems. The water shortage trigger levels are tools used to "trigger" imposition of water shortage restrictions based on climatic events, continued decline in water levels and a need to curtail human demand to correspond to decreasing supplies. Each level corresponds to a level of water shortage restriction. This information will be incorporated into the five year update of the LWC Water Supply Plan.

Total Cost: $450,000 FTEs: 3.25

Funding Source: SFWMD

Implementing Agency: SFWMD

Table 37. Summary of Estimated Schedule and Costs for Recommendation 8.1.2.

Minimum Flows and Levels		Plan Implementation Costs ($1,000s and FTEs)											
		FY01		FY02		FY03		FY04		FY05		Total	
		$	FTE	$	FTE	$	FTE	$	FTE	$	FTE	$	FTE
8.1.2 a & b	Establish MFLs including rulemaking Est. start date: ongoing Est. finish date: 12/00		1.00										1.00
8.1.2.c	Est. start date: 10/01 Est. finish date: 9/04			150	0.75	150	0.75	150	0.75			450	2.25
8.1.2	Total		1.00	150	0.75	150	0.75	150	0.75			450	3.25

8.2 Recommendation - Government Cooperation: The District should continue working with other government entities including the legislature, USEPA and FDEP to accomplish changes in ASR and desalination disposal regulations.

Description: Continue working with other government entities to identify and modify existing rule criteria to facilitate changes in ASR and desalination disposal regulations that will facilitate development of source options.

Total Cost: No direct cost associated with this recommendation. FTEs: 0.13

Funding Source: SFWMD

Implementing Agency: SFWMD

Table 38. Summary of Estimated Schedule and Costs for Recommendation 8.2.

Government Cooperation		Plan Implementation Costs ($1,000s and FTEs)											
		FY01		FY02		FY03		FY04		FY05		Total	
		$	FTE	$	FTE	$	FTE	$	FTE	$	FTE	$	FTE
8.2	Work with the legislature, FDEP, and USEPA Est. start date: 10/00 Est. finish date: 9/05		0.05		0.05		0.01		0.01		0.01		0.13
8.2 DW[a]	Total		0.05		0.05		0.01		0.01		0.01		0.13

a. DW- LWC portion of Districtwide Program.

8.3 Recommendation - Wetlands Drawdown Study: The District should continue the Wetlands Drawdown Study and use the knowledge gained during the rulemaking process in recommendation 8.1.1. The CUP Program should continue to use the existing wetland protection guidelines until such time as rulemaking causes a change.

Description: The District's Wetlands Drawdown Study was initiated in part, pursuant to the recommendations of the 1994 LWC Water Supply Plan and is an ongoing research project staffed by the District. This Study continues to conduct hydrobiological monitoring to determine the effects of ground water drawdowns on wetlands and refine the Wetland Resource Protection Criteria.

Total Cost: $600,000 FTEs: 6.50

Funding Source: SFWMD

Implementing Agency: SFWMD

Table 39. Summary of Estimated Schedule and Costs for Recommendation 8.3.

Wetland Drawdown Study		Plan Implementation Costs ($1,000s and FTEs)											
		FY01		FY02		FY03		FY04		FY05		Total	
		$	FTE	$	FTE	$	FTE	$	FTE	$	FTE	$	FTE
8.3	Continuation of Wetland Drawdown Study Est. start date: Existing Est. finish date: ongoing	120	1.30	120	1.30	120	1.30	120	1.30	120	1.30	600	6.50
8.3 DW[a]	Total	120	1.30	120	1.30	120	1.30	120	1.30	120	1.30	600	6.50

a. DW- LWC portion of Districtwide program.

8.4 Recommendation - Public Information: The District will make the ground water models, data, and other relative information referenced in this plan available to the public.

Total Cost: No direct costs are associated with recommendation 8.4. This is an ongoing District policy.

FTEs: 0

Funding Source: SFWMD

Implementing Agency: SFWMD

SUMMARY OF WATER RESOURCES DEVELOPMENT RECOMMENDATIONS

This section summarizes the recommendations presented earlier in this chapter.

1. Conservation

1.1 Recommendation - Water Conservation Program: The District will develop and implement a comprehensive water conservation program to cultivate a conservation ethic in cooperation with water users, utilities and local governments to promote water conservation and more efficient use of the water resources in the LWC Planning Area. The conservation program will incorporate continued development and compliance with water conservation ordinances, development and implementation of public education programs, use of alternative water sources, other conservation methods and documenting new and existing water conservation efforts. The conservation program will encompass all uses, but should provide emphasis on the outside use of water and Xeriscape™ principles. The creation of a water conservation coordinator position and provisions for fiscal incentives are envisioned as potential tools to establish the water conservation program to cultivate a conservation ethic.

1.2 Recommendation - Mobile Irrigation Labs: The District will support maintaining the existing mobile irrigation labs (MILs) (one agricultural, one urban) and encourage establishment of two additional MILs (one agricultural, one urban) in the LWC Planning Area through identification of dedicated non-District funding sources for existing and additional MILs.

2. Ground Water Resources

2.1 Surficial Aquifer System (SAS)

2.1.1 Recommendation - Surficial Aquifer Monitoring: The District should review existing water quality and water level monitoring for the SAS aquifers in the LWC Planning Area. Well locations and parameters should be compared with areas of current and projected land use development, utilization of the aquifer, areas of existing saltwater intrusion, and areas where there is a potential for saltwater intrusion. The District's monitoring program will be maintained and should be expanded where appropriate. Emphasis should be placed on monitoring and analysis of water levels and salinity levels.

2.1.2 Recommendation - Surficial Aquifer Rulemaking: To promote consistency, the SAS concepts and criteria used in this plan should be incorporated into the District's CUP Program and other components of the District's overall water supply management responsibilities through rulemaking, such as MFLs, coastal saltwater intrusion prevention, wetland protection, aquifer protection from excessive drawdowns, aquifer monitoring, and protection from contamination.

2.1.3 Recommendation - Surficial Aquifer Modeling: As soon as it feasible, but no later than the five year update to this plan, the District shall conduct a regional evaluation, using the finer grid models currently under development for renewal of CUP's, of the effects the projected demands might have on these aquifers and the

associated water resources. If this regional analysis identifies potential problems, the District should revise this plan, and identify specific water resource and water supply development projects to meet the projected needs.

2.2 Intermediate Aquifer System (IAS)

2.2.1 Recommendation - Intermediate Aquifer Monitoring: The District should review existing water quality and water level monitoring for the IAS aquifers in the LWC Planning Area. Well locations and parameters should be compared with areas of current and projected land use development, utilization of the aquifer, areas of existing saltwater intrusion, and areas where there is a potential for saltwater intrusion. The District's monitoring program will be maintained and should be expanded where appropriate. Emphasis should be placed on monitoring and analysis of water levels and salinity levels.

2.2.2 Recommendation - Intermediate Aquifer Rulemaking: To promote consistency, the IAS concepts and criteria used in this plan should be incorporated into the District's CUP Program and other components of the Districts overall water supply management responsibilities through rulemaking, such as MFLs, coastal saltwater intrusion prevention, aquifer protection from excessive drawdowns, aquifer monitoring, and protection from contamination. In addition, the District should incorporate a rule in the CUP Program that does not provide protection for "inefficient" facilities, such as centrifugal pumps located at land surface. Consideration of interim protection of existing facilities should be included.

2.2.3 Recommendation - Intermediate Aquifer Modeling: As soon as it feasible, but no later than the five year update of this plan, the District shall conduct a regional evaluation, using the finer grid models currently under development for renewal of CUP's, of the effects the projected demands might have on these aquifers and the associated water resources. If this regional analysis identifies potential problems, the District should revise this plan, and identify specific water resource and water supply development projects to meet the projected needs.

2.3 Floridan Aquifer System (FAS)

2.3.1 Recommendation - Floridan Aquifer Model: The District should develop a comprehensive FAS ground water model based on all existing and future information available focusing on Lee, Collier and possibly Hendry counties to conduct predictive analysis in the future. This model would be for use by the District and public to evaluate both water withdrawals and storage via ASR. The model should be developed and refined with user participation and information collected through the CUP Program, water users, utilities, and other sources with regard to water quality, water levels and hydrologic characteristics, when appropriate. Other sources that may be utilized include existing monitoring wells or wells that may be converted to monitoring wells instead of being abandoned. Appropriate well site selection should consider model boundary conditions and not be limited to the LWC Planning Area.

2.3.2 Recommendation - Floridan Aquifer Monitoring: The District should expand the FAS ground water monitoring network to collect the data necessary to establish the relationship between water use, water levels, and water quality in the LWC Planning Area.

2.3.3 Recommendation - Floridan Aquifer Data Partnerships: The District should develop and recognize partnership agreements during development of the scope of work with water users and utilities who are planning to develop the FAS for water supply, ASR, or wastewater effluent disposal. These partnerships will collect water quality, water level, and hydrologic information related to the FAS. Information could be gained via packer tests, coring/testing of specific intervals plus geophysical logging (e.g. permeability logs) and aquifer performance testing. The District should budget for these items and cost-share for additional testing and data acquisition. The development of partnerships to share collected data will be in addition to and complementary to the data collection efforts described in tasks 2.3.1 and 2.3.2.

2.3.4 Recommendation - Floridan Aquifer Government Cooperation: The District should continue to work with other government entities, including the legislature, FDEP and USEPA to explore environmentally acceptable alternative desalination concentrate disposal options.

3. Reclaimed Water

Refer to the Regional Irrigation System Source Option

4. Regional Irrigation System

4.1 Recommendation - Regional Irrigation System Study: The District will evaluate, with assistance from LWC local governments, water users, and utilities, the feasibility of constructing a subregional irrigation water distribution system(s) and other options to meet the growing urban irrigation demands of this area. Reclaimed water should be used, and where available, should be incorporated into the evaluation. The results of this study should be incorporated in the update of this plan.

5. Seawater

None

6. Storage

6.1 Aquifer Storage and Recovery (ASR)

6.1.1 Recommendation - ASR Water Quality: The District should continue working with other government entities, including the legislature, Congress, USEPA and FDEP, to explore rule changes to the federal and state Underground Injection Control (UIC) program to allow for (and encourage) injection of untreated or partially treated ground water or surface water with ASR. The level of treatment should be compatible with the water quality in the proposed storage zone.

6.1.2 Recommendation - ASR Rulemaking: The District should develop CUP rules to address the use of the Floridan aquifer for ASR, as well as water use, to assure compatibility between use concepts.

6.2 Regional and Local Retention

6.2.1 Recommendation - Regional and Local Retention: Retention projects that raise water levels through either system modifications or operation changes and benefit water supply without causing environmental harm should be considered for cost-sharing from the District's Water Resource Development funds. Potential retention projects as described above include Big Cypress Basin projects and possibly additional work in the Gator Slough and the Fred C. Babcock/Cecile M. Webb Wildlife Management Area, the southern CREW land, and projects related to implementation of the South Lee County Watershed Plan.

6.3 Reservoirs

Regional and distributed small scale reservoirs are being recommended in the Caloosahatchee Basin. Refer to Surface water section for CWMP recommendations.

7. Surface Water

7.1 Recommendation from CWMP - Caloosahatchee River ASR Pilot Project: The District should work cooperatively with the USACE to site, design, construct, and operate a pilot regional ASR project. Recovery performance and additional information obtained from the construction of and cycle testing at this facility will guide the design of the regional ASR wellfield.

7.2 Recommendation from CWMP - C-43 Storage Project: The SFWMD should cooperate with the USACE in development of the Project Implementation Report (PIR), design, construction, and operation of a regional reservoir and ASR project within the Caloosahatchee Basin. A comprehensive geologic and geotechnical investigation should be completed, as a part of the PIR to provide the information needed to size and design the reservoir. Development of the PIR, land acquisition,

design, and plans and specifications should be completed by 2005. Construction should be initiated in 2005.

7.3 Recommendation from CWMP - Southwest Florida Study: The SFWMD should work in cooperation with the USACE to initiate and complete the Southwest Florida Study (SWFS) by the year 2005 as recommended in the CERP. The modeling work that has been completed as a part of the CWMP should be used as the basis for development of a preferred alternative to meet the demands within the Caloosahatchee Basin in 2020. The primary purpose of the SWFS should be to provide a framework in which to address the health of aquatic ecosystems; water flows; water quality (including appropriate pollution reduction targets); water supply; flood protection; wildlife and biological diversity; and natural habitat. Evaluations involving surface water availability for water supply purposes should be based on providing a 1-in-10 level of certainty from surface water as an optimal goal.

7.4 Recommendation from CWMP - Minimum Flows and Levels: Establish MFL for the Caloosahatchee River and Estuary by December, 2000 in accordance with Section 373.042, F.S. The MFLs will be incorporated into rulemaking described in the LWC Water Supply Plan in Recommendation 8.1.1 and 8.1.2.

7.5 Recommendation from CWMP - Well Abandonment Program: The Well Abandonment Program that was administered by the SFWMD (ended in 1991) was a voluntary program that identified abandoned artesian wells, geophysically logged them, and plugged or rehabilitated the wells, as necessary, to prevent deterioration of the SAS through upland leakage or discharge to land surface. The program documentation indicates that there are unplugged wells remaining within the planning area that if plugged could contribute an estimated net flow of 50,000-acre feet per year to the water budget of the Caloosahatchee Basin. In addition, the Florida Geological Survey, Bureau of Oil and Gas have identified oil test wells within the planning area that have not been adequately plugged. Additional effort should be made to locate and properly abandon the free flowing wells in the Caloosahatchee Basin. The SFWMD should work with local and state officials to locate uncontrolled abandoned wells and identify plugging strategies and applicable funding sources for proper plugging of the wells.

7.6 Recommendation from CWMP - Salt Water Influence: Saline water (in excess of 250 milligrams per liter [mg/L]) has been a recurring problem for the potable water intakes in the Caloosahatchee River (approximately one-mile upstream of S-79). During extended periods of low-flow, the chloride content of the shallow water increases well beyond the recommended limit of 250 mg/L for drinking water. The actual number of times that releases have been made from Lake Okeechobee in response to salt water in excess of 250 mg/L is relatively few. A number of alternatives to these releases warrant further investigation and include moving the intake farther upstream, modifications to the structure, and improved maintenance and operation of the bubble curtain. Future freshwater releases for environmental

purposes may also minimize salt water influence. Additional analysis of the saline front migration should be initiated.

7.7 Recommendation from CWMP - Permitting Issues Associated with ASRs: The SFWMD should continue working with the legislature, USEPA, and FDEP to explore rule changes to the federal and state Underground Injection Control program to allow for (and encourage) injection of untreated or partially treated ground water or surface water with ASR. The level of treatment should be compatible with the water quality in the proposed storage zone. This recommendation is included in Recommendation 8.2.

7.8 Recommendation - Southwest Florida Study: The Southwest Florida Study should evaluate estuary and other environmental needs for the flows from surface water bodies including: Orange River/Harn's Marsh/East County Water Control District (Lehigh Canals), Imperial River/Kehl Canal, Ten Mile Canal/Mullock Creek, Golden Gate Canal/Gordon River, and the Faka Union Canal. The results of this evaluation should be incorporated into future LWC Water Supply Plan updates.

8. Related Implementation Strategies

8.1.1 Recommendation - Rulemaking: The District will conduct a public rulemaking process in accordance with Chapter 120, F.S. for the purpose of incorporating salient portions of this plan in the CUP Program and other components of District's overall water supply management responsibilities. Matters that are recommended for rulemaking consideration include: (1) Level of Certainty; (2) Resource Protection Criteria; (3) Water Shortage Triggers; (4) Minimum flows and levels for the Caloosahatchee River and Estuary, and the LWC aquifer system; and (5) Special Designation Area amendments, including Reduced Threshold Areas and Water Resource Caution Areas.

8.1.2 Recommendation - Minimum Flows and Levels: Establish MFLs for the Caloosahatchee River and Estuary and LWC aquifer system by December, 2000 in accordance with Section 373.042, F.S. The MFL will be incorporated into rulemaking, described in recommendation 8.1.1.

8.2 Recommendation - Government Cooperation: The District should continue working with other government entities including the legislature, USEPA and FDEP to accomplish changes in ASR and desalination disposal regulations.

8.3 Recommendation - Wetlands Drawdown Study: The District should continue the Wetlands Drawdown Study and use the knowledge gained during the rulemaking process in recommendation 8.1.1. The CUP Program should continue to use the existing wetland protection guidelines until such time as rulemaking causes a change.

8.4 Recommendation - Public Information: The District will make the ground water models, data, and other relative information referenced in this plan available to the public

Table 40. Recommendation Summary Table.

Recommendation Summary Table		Plan Implementation Costs ($1,000s and FTEs)											
		FY01		FY02		FY03		FY04		FY05		Total	
		$	FTE	$	FTE	$	FTE	$	FTE	$	FTE	$	FTE
1.1 DW	Water Conservation Program	85	0.30	85	0.30	85	0.30	85	0.30	85	0.30	425	1.50
1.2	Mobile Irrigation Labs		0.21		0.01		0.01		0.01		0.01		0.25
2.1.1	Surficial Aquifer Monitoring		0.60	220	1.50	120	0.75	60	0.25	60	0.25	460	3.35
2.2.1	Intermediate Aquifer Monitoring		0.60	340	0.45	50	0.20	50	0.20	50	0.20	490	1.65
2.3.1	Floridan Aquifer Model		0.50	700	1.00	1,420	4.20	390	2.90	20	1.10	2,530	9.70
2.3.2	Floridan Aquifer Monitoring	107	1.40	41	0.50	49	0.60	51	0.60	51	0.60	299	3.70
2.3.3	Floridan Aquifer Data Partnerships	100	0.20	100	0.40	100	0.40	100	0.20	100	0.20	500	1.40
4.1	Regional Irrigation System Study	200	3.50		0.70		0.30					200	4.50
6.2.1	Regional and Local Retention	300	0.10	300	0.10	300	0.10	300	0.10	300	0.10	1,500	0.50
7.1 CWMP	Caloosahatchee River ASR Pilot Project	250		2,300		280		84		84		2,998	
7.2 CWMP	C-43 Storage Project	2,154		2,163		23,925		66,386		43,466		138,094	
7.3 CWMP	Southwest Florida Study	1,000		1,800		1,800		1,000		500		6,100	
7.5 CWMP	Well Abandonment Program		0.30		0.30								0.60
7.6 CWMP	Salt Water Influence		0.30										0.30
8.1.1 DW	Rulemaking		2.00										2.00
8.1.2 DW	Minimum Flows and Levels		1.00	150	0.75	150	0.75	150	0.75			450	3.25
8.2 DW	Government Cooperation		0.05		0.05		0.01		0.01		0.01		0.13
8.3 DW	Wetland Drawdown Study	120	1.30	120	1.30	120	1.30	120	1.30	120	1.30	600	6.50
Total		4,316	12.36	8,319	7.36	28,399	8.92	68,776	6.62	44,836	4.07	154,646	39.33

DW-Lower West Coast portion of a Districtwide Program; all costs are in $1,000's.

RELATIONSHIP OF PROJECTS TO FIVE-YEAR WORK PROGRAM

The District is required to prepare a Five-Year Water Resource Development Work Program annually. This report is submitted to DEP, and documents the District's progress in implementing water supply plan recommendations. The time frame for the work program is a five year minimum. For each recommendation or strategy, the work program will provide the following information:

- The total cost of the project
- An estimate of the amount of water to become available by implementation of a project
- Funding source
- Implementing agency
- A summary of any changes to the recommendation since the plan was implemented
- Timetables for the Five-Year Work Program
- A description of the District's progress towards achieving water resource development objectives

The recommendations in this plan will be incorporated into the the Five-Year Water Resource Development Work Program following Governing Board approval. Development of the next Five-Year Water Resource Development Work Program is anticipated to begin in mid-2000.

FUNDING

This section addresses the funding strategy and options for implementation of this Water Supply Plan. The approach takes into account the requirements of Chapter 373, F.S., feedback and comments from the advisory committee, and input from District staff. Chapter 373 requires water supply plans to include a funding strategy that is reasonable and sufficient to pay the costs of constructing or implementing all of the water resource development projects.

In general, the funding approach is divided into two major categories: water resource development and water supply development. The water resource development category addresses funding for projects that are primarily the responsibility of the District. Water supply development projects, on the other hand, are primarily the responsibility of local governments, utilities, and other water users. However, information is included on programs that target funding of water supply development projects in general.

Water Resource Development

Water resource development projects are generally regional in nature and are primarily the responsibility of the District. The water resource development projects for the LWC Planning Area were itemized earlier in this chapter. In addition, pursuant to Chapter 373, F.S., each water management district governing board is required to include in its annual budget the amount needed for the fiscal year to implement water resource development projects, as prioritized in its regional water supply plans. In addition to this plan, the District is also completing regional water supply plans for two other planning areas while approaching the third year of implementation of the Upper East Coast Water Supply Plan.

Besides implementation of the water supply plans, the SFWMD is initiating implementation of the $8 billion Comprehensive Everglades Restoration Plan (CERP), a cost-shared effort with the U. S. Army Corps of Engineers (USACE). It is anticipated significant District financial resources will be used for this project. It is not known to staff at this time the impact that these efforts will have on the District's resources in the future. Consequently, timelines for implementation of the plan recommendations may have to be adjusted in the future. Any future changes to these timelines will be identified in the annual updates to the District's Five-Year Water Resource Development Work Program. The recommendation tables in the plan show the costs of the projects and potential sources of funding. Timeframes for completing the projects are preliminary and are subject to funding availability in the future years.

The traditional funding source for these types of projects has been primarily ad valorem taxes. Non-CERP projects, most of those listed in this plan, will be ranked and prioritized along with projects in all other regional water supply plans during annual District budget preparation, and funded as money is available. Priority considerations for a project include availability of a cost-share partner and if a project makes "new" water available. Sustainability of the regional system is also an important consideration of project prioritization.

Some of the recommendations in this plan are studies. These studies may result in construction projects at a later date. Funding associated with these will be addressed at that time. Potential funding sources for water resource development include funds provided on a project-by-project basis by the SFWMD's budget.

Water Supply Development

Water supply development projects are local in nature and generally involve the withdrawal, treatment, and distribution of water. Chapter 373 states that, “local governments, regional water supply authorities, and government-owned and privately owned water utilities take the lead in securing funds for and implementing water supply development projects. Generally, direct beneficiaries of water supply development projects should pay the costs of the projects from which they benefit, and water supply development projects should continue to be paid for through local funding sources." It is

not the intent that regional water supply plans mandate actions to be taken by local agencies, utilities, and other water users. Therefore, the overall theme of this section is to provide direction and assistance, but not to mandate directives to local governments or utilities.

Chapter 373 requires water supply plans to identify potential sources of funding for water supply development projects. In addition to funding the projects themselves through utility rates, there are several other funding programs to assist local entities.

Water Resource Protection and Restoration Projects Funding Program

On January 18, 2000, Governor Jeb Bush announced his proposal to finance the protection and preservation of Florida's water resources. The Governor's proposed budget provides $73 million dollars to fund water resource restoration projects, which include wastewater treatment plant upgrades and storm water treatment areas. This represents an increase of 38 percent over last year's water project funding.

Projects eligible for the funding must address such criteria as resolving violations of state water quality standards, preventing drainage and flood control problems, and resolving public health threats. Projects requesting funding for surface water restoration and wastewater improvements will be reviewed by the Water Advisory Panel to ensure eligibility.

The Governor created the Water Advisory Panel to ensure that efforts to protect and preserve Florida's water resources is priority-driven, objective, and policy-based. Projects determined by the panel as meeting the criteria will be forwarded to the legislature for funding consideration. This process ensures that state dollars are providing needed and meaningful improvements to state water resources.

The featured project must be identified in a water management district or Florida Department of Environmental Protection plan as part of a surface water restoration effort. In addition, storm water related restoration projects that have a flood component must be identified in a storm water mitigation master plan and have quantifiable flood protection targets. For wastewater facilities projects, grant recipients must have or agree to adopt an ordinance requiring mandatory waste management hookup upon failure of individual systems. The sponsor, or recipient, of the wastewater facilities projects is expected to fund at least 25 percent of the total project costs.

District's Alternative Water Supply Grant Program

Vastly increased demands on natural supplies of freshwater led the Florida legislature in 1995 to enact the Alternative Water Supply Grant Program to increase the potential for the development of alternative water supplies in the state; help utilities develop cost-effective reclaimed water supplies; and fulfill a public purpose to fund such programs. Since FY97, the District has funded 82 projects in its Water Resource Caution Areas for a total of approximately $20 million.

The funds available vary annually as determined during the District's budget process. Increased funding needs for Everglades restoration are currently competing with funding for other District programs, including the Alternative Water Supply Grant Program. Significant decreases in funding of this program are projected in FY01. The Advisory Committee recommends that the Governing Board reasses the funding needs of the Alternative Water Supply Grant Program on an annual basis or periodic basis, recognizing its significant potential benefit to water supply development in the District.

The Alternative Water Supply Grant Program is a cost share program that provides a portion of funding for alternative water supply projects built by local, county, or private water purveyors. Since FY97, the District has provided funds for projects that save or offset millions of gallons of water every day.

To be considered for this funding support, the project must be consistent with the local government plan and must be located in a Water Resource Caution Area. The local government must require all appropriate new facilities within the project service area to connect and use the project's alternative water supplies. Funding support shall be applied only for the capital or infrastructure costs for the construction for alternative water supply systems and the project must fall within guidelines established by the District.

Projects are scored and ranked by a selection committee of non-SFWMD representatives from utilities, the environment, and agricultural interests. They score and rank submitted project proposals based on criteria from the enabling legislation, the SFWMD, and the Water Resources Development Act, described earlier.

Drinking Water State Revolving Fund Program

The 1996 Amendments to the Safe Drinking Water Act (SDWA) authorized USEPA to award grants to states for capitalization of Drinking Water State Revolving Funds (DWSRF). These are intended to be a source of financial assistance to public water systems to achieve compliance with Drinking Water Regulations and protecting public health. States must provide matching funds equal to at least 20 percent of the grant.

There are two elements of a DWSRF. The first element is establishment of a loan fund enabling a state to make below-market loans to public water systems for the construction of projects. (A PWS can be publicly or privately-owned but some states have statutory or constitutional restrictions limiting funding for privately-owned systems.) States must adopt a priority system, ranking projects based on considerations of public health, compliance and affordability (systems most in need), and are required to fund to the maximum extent practical in priority order.

The second element of a DWSRF is the ability to provide set-aside money to assist PWSs in meeting regulatory requirements through direct assistance, loans, and/or state grants funding capacity development, source water assessment, source water protection, and operator certification.

REGIONAL WATER SUPPLY PLAN IMPLEMENTATION ASSURANCES

Background

During the next 20 years, the SFWMD, the State of Florida, and consumptive users will be partners in implementing regional water supply plans (RWSPs) per a directive of state statute in Section 373.0361, F.S. The RWSPs provide a guide map for meeting consumptive user demands and natural system demands projected in 2020. There are economic, technical and political uncertainties associated with implementing water resource development projects of the complexity and scope recommended in the regional water supply plans. These uncertainties will be particularly evident during the interim period during which the various elements will be implemented and become operational. Reasonable certainty is needed for the protection of existing legal users and the water resources during the interim period.

Water resource development projects, operational changes, consumptive use permitting and rulemaking associated with the RWSPs are proposed to occur in phases. The increasing demands of consumptive users and the environment must, to the extent practicable, correspond with the timing of increased water availability. Where shifts from existing sources of water are required for environmental enhancement, it is crucial that replacement sources are available when such shifts occur.

Existing Florida law provides the framework and includes several tools to protect and maintain this phased or incremental consistency between increasing supplies and demands for both consumptive users and the environment. These include water reservations, consumptive use permits, minimum flows and levels recovery strategies, and water shortage declarations. The framework for implementing these tools for resource restoration and protection from harm, significant harm and serious harm.

A composite schedule for implementation of these water resource tools in concert with water resource development projects will be proposed in the RWSPs. This schedule will be further refined during the five year water resource development work plan, five year water supply plan updates, annual budget reviews, periodic rule updates, and consumptive use permit renewals. Processes for contingency planning will also be developed to address uncertainties in the fulfillment of the water supply plans with the goal of complying with State requirements for the protection of existing legal users and environmental resources.

Water User and Natural System Assurances

The level of assurances in protecting existing legal water users and the natural systems (assurances) while implementing the regional water supply plans must be consistent with Chapter 373, F.S. In this implementation process, the District's Governing Board will be faced with many policy decisions regarding the application and interpretation of the law. The unique legal, technical, economical, and political

implications of the regional water supply plans will all be considered in making these policy decisions. The District will be facing many of these issues for the first time in terms of their scale and significance.

The subject of assurances has been addressed in other forums, particularly in the *Central and Southern Florida Project Comprehensive Review Study Final Integrated Feasibility Report and Programmatic Environmental Impact Statement* (Restudy) (USACE and SFWMD, 1999). Although these assurances were developed in the context of the Restudy implementation, such assurances are applicable to implementation of regional water supply plan recommendations under state law and have been approved by the District's Governing Board. The Governing Board directs staff to implement the LWC Water Supply Plan in accordance with the following assurances (from section 10.2.9 of Restudy):

Assurances To Water Users

The concept of "assurances" is key to the successful implementation of the Comprehensive Plan. Assurances can be defined in part as protecting, during the implementation phases of the Comprehensive Plan, the current level(s) of service for water supply and flood protection that exist within the current applicable Florida permitting statutes. Assurances also involve protection of the natural system.

The current C&SF Project[1] has generally provided most urban and agricultural water users with a level of water supply and flood protection adequate to satisfy their needs. Florida law requires that all reasonable beneficial water uses and natural system demands be met. However, the C&SF Project, or regional system, is just one source of water for South Florida to be used in concert with other traditional and alternative water supplies.

The Governor's Commission for a Sustainable South Florida developed a consensus-based set of recommendations concerning assurances to existing users, including the natural system (GCFSSF, 1999). The following text is taken from the Commission's *Restudy Plan Report*, which was adopted on January 20, 1999:

"Assurances are needed for existing legal users during the period of plan implementation. It is an important principle that has helped gain consensus for the Restudy that human users will not suffer from the environmental restoration provided by the Restudy. At the same time, assurances are needed that, once restored, South Florida's natural environment will not again be negatively impacted by water management activities. Getting 'from here to there' is a challenge. The implementation plan will be the key to assuring predictability and fairness in the process.

Protecting Current Levels of Service (Water Supply and Flood Protection) during the Transition from the Old to the New C&SF Project.

1. C&SF Project refers to the Central and Southern Florida Project for Flood Control and Other Purposes.

The goal of a sustainable South Florida is to have a healthy Everglades ecosystem that can coexist with a vibrant economy and quality communities. The current C&SF Project has generally provided most urban and agricultural water users with a level of water supply and flood protection adequate to satisfy their needs. In fact, if properly managed, enough water exists within the South Florida system to meet restoration and future water supply needs for the region. However, past water management activities in South Florida, geared predominantly toward satisfying urban and agricultural demands, have often ignored the many needs of the natural system (GCSSF, 1995; transmittal letter to Governor Chiles, p. 2). Specifically, water managers of the C&SF Project historically discharged vast amounts of water to tide to satisfy their mandate to provide flood protection for South Florida residents, oftentimes adversely impacting the region's estuarine communities.

The Commission recommended that in the Restudy, the SFWMD and the Corps[1] should ensure that the redesign of the system allows for a resilient and healthy natural system (GCSSF, 1995; p. 51) and ensure an adequate water supply and flood protection for urban, natural, and agricultural needs (GCSSF, 1996a; p.14). In response to the need to restore South Florida's ecosystem, and in light of the expected future increase of urban and agricultural water demands, the Restudy aims to capture a large percentage of water wasted to tide or lost through evapotranspiration for use by both the built and natural systems. In order to maximize water storage, the Restudy intends to use a variety of technologies located throughout the South Florida region so that no one single area bears a disproportionate share of the storage burden. This direction reinforces the Commission's recommendation that water storage must be achieved in all areas of the South Florida system using every practical option (GCSSF, 1996a; p. 25).

However, concerns have been expressed that a water user would be forced to rely on a new water storage technology before that technology is capable of fully providing a water supply source or that existing supplies would otherwise be transferred or limited, and that the user would thereby experience a loss of their current legal water supply level of service. Any widespread use of a new technology certainly has potential limitations; however, the Restudy should address technical uncertainties prior to project authorization and resolve them before implementation in the new C&SF Project. With the addition of increased water storage capabilities, water managers will likely shift many current water users to different water sources.

Additionally, stakeholders are concerned that a preservation of the current level of service for legal uses would not encompass all the urban uses, some of which are not incorporated in the term 'legal' and covered by permit. Specifically, an adequate water supply is needed to address urban environmental preservation efforts as well as water level maintenance to reduce the impact of salt water intrusion.

1. U.S. Army Corps of Engineers

The Commission believes that in connection with the Restudy, the SFWMD should not transfer existing legal water users from their present sources of supply of water to alternative sources until the new sources can reliably supply the existing legal uses. The SFWMD should implement full use of the capabilities of the new sources, as they become available, while continuing to provide legal water users as needed from current sources. It is the Commission's intent that existing legal water users be protected from the potential loss of existing levels of service resulting from the implementation of the Restudy, to the extent permitted by law.

The Commission also recognizes that the SFWMD cannot transfer the Seminole Tribe of Florida from its current sources of water supply without first obtaining the Tribe's consent. This condition exists pursuant to the Seminole Tribe's Water Rights Compact, authorized by Federal (P.L. 100-228) and State Law (s285.165, F.S.).

However, the issues surrounding the development of specific assurances to water users are exceedingly complex and will require substantial additional effort to resolve.

RECOMMENDATION

- *The SFWMD and the Corps should work with all stakeholders to develop appropriate water user assurances to be incorporated as part of the Restudy authorizations. These water user assurances should be based on the following principles:*

  A. Physical or operational modifications to the C&SF Project by the federal government or the SFWMD will not interfere with existing legal uses and will not adversely impact existing levels of service for flood management or water use, consistent with State and federal law.

  B. Environmental and other water supply initiatives contained in the Restudy shall be implemented through appropriate State (Chapter 373 F.S.) processes.

  C. In its role as local sponsor for the Restudy, the SFWMD will comply with its responsibilities under State water law (Chapter 373 F.S.).

  D. Existing Chapter 373 F.S. authority for the SFWMD to manage and protect the water resources shall be preserved.

<u>Water Supply for Natural Systems</u>

Concerns have been raised about long term protection of the Everglades ecosystem. According to WRDA 1996[1], the C&SF Project is to be rebuilt 'for the purpose of restoring, preserving, and protecting the South Florida ecosystem' and 'to provide for all the water-related needs of the region, including flood control, the enhancement of water supplies, and other objectives served by the C&SF Project.'

1. The Water Resource Development Act of 1996 (WRDA 1996) is legislation passed by the U.S. Congress that authorized the Restudy, the Water Preserve Area Feasibility Study, etc.

Environmental benefits achieved by the Restudy must not be lost to future water demands. When project implementation is complete, there must be ways to protect the natural environment so that the gains of the Restudy are not lost and the natural systems, on which South Florida depends, remain sustainable.

A proactive approach which includes early identification of future environmental water supplies and ways to protect those supplies under Chapter 373 F.S. will minimize future conflict. Reservations for protection of fish and wildlife or public health and safety can be adopted early in the process and conditioned on completion and testing of components to assure that replacement sources for existing users are on line and dependable. The SFWMD should use all available tools, consistent with Florida Statutes, to plan for a fair and predictable transition and long term protection of water resources for the natural and human systems.

Apart from the more general goals of the Restudy, there are specific expectations on the part of the joint sponsors - the State and the federal government. The more discussion that goes into an early agreement on expected outcomes, the less conflict there will be throughout the project construction and operation.

RECOMMENDATIONS

- *The SFWMD should use the tools in Chapter 373 F.S. to protect water supplies necessary for a sustainable Everglades ecosystem. This should include early planning and adoption of reservations. These reservations for the natural system should be conditioned on providing a replacement water source for existing legal users which are consistent with the public interest. Such replacement sources should be determined to be on line and dependable before users are required to transfer.*

- *The SFWMD should expeditiously develop a 'recovery plan' that identifies timely alternative water supply sources for existing legal water users. The recovery plan should consist of water supply sources that can reliably supply existing uses and whose development will not result in a loss of current levels of service, to the extent permitted by law. To assure that long term goals are met, the State and federal governments should agree on specific benefits to water users, including the natural system, that will be maintained during the recovery.*

- *In the short term, the Restudy should minimize adverse effects of implementation on critical and/or imperiled habitats and populations of State and federally listed threatened and/or endangered species. In the long term, the Restudy should contribute to the recovery of threatened species and their habitats.*

<u>Protecting Urban Natural Systems and Water Levels</u>

Water supply for the urban environment is connected to water supply for the Everglades and other natural areas targeted for restoration and preservation under the Restudy.

It is essential that the Restudy projects proposed to restore and preserve the environment of the Everglades do not reduce the availability of water to such an extent in urban areas that the maintenance of water levels and the preservation of natural areas becomes physically or economically infeasible.

The successful restoration of Everglades functions is dependent not only upon the establishment of correct hydropatterns within the remaining Everglades, but also upon the preservation and expansion of wetlands, including those within urban natural areas that once formed the eastern Everglades. Some of the westernmost of these areas have been incorporated in the Restudy as components of the WPAs[1]. However, the on-going preservation efforts of local governments have acquired hundreds of millions of dollars worth of additional natural areas for protection both inside and outside of the WPA footprint.

Water supplies for these urban wetlands are not covered by existing permits or reservations and are therefore, not adequately protected. Efforts are underway at both the SFWMD and the local level to preserve these vital areas and assure their continuing function as natural areas and in ecosystem restoration.

Detailed design for the Restudy, in particular the detailed modeling associated with the WPA Feasibility Study, will make possible plans to protect these urban wetlands from damage and to assure maximum integration with Restudy components.

RECOMMENDATIONS

- *The SFWMD and the Corps should acknowledge the important role of urban natural areas as an integral part in the restoration of a functional Everglades system. As a part of the implementation plan, the SFWMD and the Corps should develop an assurance methodology in conjunction with the detailed design and modeling processes, such as the WPA Feasibility Study, to provide the availability of a water supply adequate for urban natural systems and water level maintenance during both implementation and long term operations.*

- *Expand and accelerate implementation of the WPAs. Accelerate the acquisition of all lands within the WPA footprint to restore hydrologic functions in the Everglades ecosystem, and ensure hydrologic connectivity within the WPA footprint. The WPA Feasibility Study process should be given a high priority. The WPA concept should be expanded into other SFWMD planning areas such as the Upper East Coast.*

- *The Restudy should assure that the ecological functions of the Pennsuco wetlands are preserved and enhanced."*

There is a substantial body of law that relates to the operation of Federal flood control projects, both at the state and federal level. Much of the Governor's

1. Water Preserve Areas

Commission language is directed to the South Florida Water Management District and matters of state law. To the extent that the Governor's Commission's guidance applies to the Corps' actions, the Corps will give it the highest consideration as Restudy planning proceeds and as plan components are constructed and brought on-line consistent with state and federal law. The recommended Comprehensive Plan does not address or recommend the creation or restriction of new legal entitlements to water supplies or flood control benefits.